

EXAMINER'S

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## PATENT SPECIFICATION

174,917

Convention Date (Germany) : Feb. 2, 1921.

Application Date (in United Kingdom) : Jan. 13, 1922. No. 1214 / 22.

Complete Accepted : Mar. 2, 1922.



## COMPLETE SPECIFICATION.

## Improvements in or relating to Ball Bearings.

I, FRIEDRICH HOLLMANN, of Bismarck-  
turnstrasse, Wetzlar, Germany, a  
German subject, do hereby declare the  
nature of this invention and in what  
manner the same is to be performed, to  
be particularly described and ascertained  
in and by the following statement:—

In ball bearings it has already been  
proposed to arrange the individual rows  
of balls obliquely with relation to the  
axis in order, as far as possible, to pre-  
vent the balls from grooving the races.  
The proposal was to place a cage round  
the balls to cause them to run in the  
required direction. This method, how-  
ever, is attended with the defect that in  
consequence of their oblique position the  
balls are subjected to considerable fric-  
tion against the cage, and that the balls  
themselves only come into contact with  
the inner race at certain points, so that  
the race very soon wears down and the  
bearing works loose. Moreover, this kind  
of ball bearing cannot be constructed as  
an oscillatory bearing, and therefore if  
not very carefully mounted, or if there  
be any bending of the shaft considerable  
friction and seizing is set up.

According to the present invention the  
oblique arrangement of the rows of balls  
is obtained by providing obliquely  
arranged grooves on one of the ball-bear-  
ing races.

All the balls in a row then run on a  
comparatively broad surface on the other  
race so that the balls cannot groove the  
rings. At the same time the working  
surface of one of the races may be given  
a spherical form, concave on the outer  
race and convex on the inner one. This  
also affords the advantage that the bear-  
ing may be used as an oscillatory bearing  
and therefore adjust itself automatically

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in cases of inaccurate mounting, wear or  
bending of the shaft. In this way 45  
simplicity of construction is combined  
with much easier running of the bear-  
ing, automatic adjustment and longer  
service.

Several embodiments of the invention 50  
are illustrated in the accompanying  
drawing in which Fig. 1 represents a  
first embodiment in longitudinal section,  
parts broken away; Fig. 2 shows an  
arrangement with only a single row of 55  
balls, whilst Figs. 3 and 4 represent  
forms with two rows of balls on non-  
parallel planes; and Fig. 5 shows an  
embodiment in which the inner race is  
provided with half-grooves. 60

In the embodiment according to Fig.  
1, the outer race is indicated by *b*, the  
inner race by *c* and the grooves by *a*.  
The balls are marked *d*. The inner  
surface of the outer race *b* is in the form 65  
of a segment of a concave sphere having  
at its centre the common centre of both  
races, whilst the grooves *a* in the inner  
race *c* run obliquely in relation to the  
axis of the bearing. The result of this 70  
arrangement is that the individual balls,  
for example those in the left hand row,  
do not run on the same track but along  
adjacent paths *f*, *g*, *h* so that a broad  
running surface is obtained on the outer 75  
race and therefore a corresponding  
diminution of wear.

In the embodiment according to Fig.  
2, only a single row of balls is provided,  
this row also being arranged obliquely 80  
with relation to the axis. In this case,  
too, the inner surface of the outer race *b*  
is a segment of a sphere, and the inner  
race *c* is provided with a groove.

In the embodiment according to Fig. 85  
3, two rows of balls are provided, but

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unlike the arrangement according to Fig. 1, these rows are not parallel to one another nor in their obliquity with relation to the axis, but enclose a definite angle between them. The diameter of the two rows may also be different.

In the embodiment according to Fig. 4, the rows of balls are also not parallel to each other on the axis, but are arranged symmetrically and are therefore of uniform diameter.

Finally, in the embodiment according to Fig. 5, a rib *f* is provided on the inner race, which rib separates the two rows of balls and slopes away on either side into a half-groove *g* in which the balls run.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A ball bearing provided with rows of balls guided obliquely with regard to

the axis by the arrangement in one of the ball races of the usual grooves or half grooves at the requisite angle with regard to the axis.

2. A constructional form of the ball bearing as claimed in Claim 1, in which the outer ball race is provided with a spherical face.

3. A constructional form of the ball bearing as claimed in Claim 1 or 2, wherein the cylindrical surface of the race provided with the oblique grooves is arranged at an angle with regard to its bore.

4. The ball bearings constructed and operating substantially as described and illustrated in the annexed drawings.

Dated this 13th day of January, 1922.

DICKER & POLLAK,

Chartered Patent Agents,

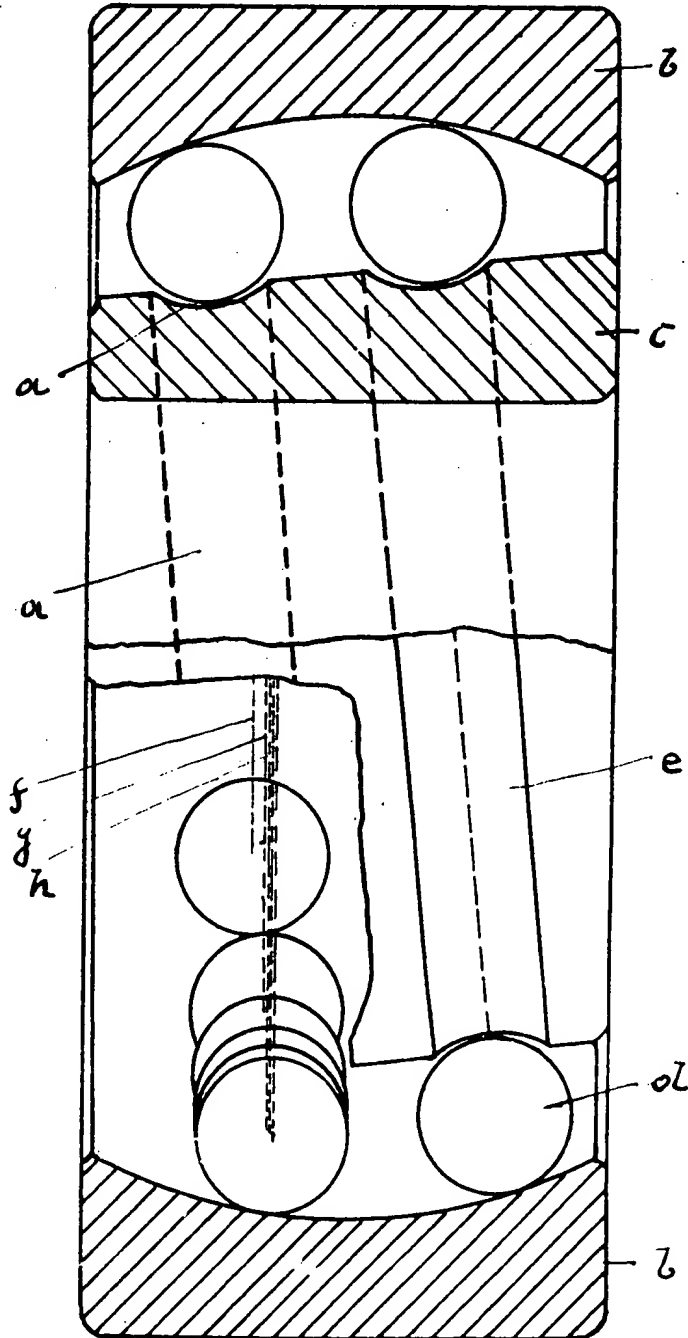
20—23, Holborn, London, E.C.1,

Agents for the Applicant.

[This Drawing is a reproduction of the Original on a reduced scale]

64  
B/6

Fig. 1



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2 SHEETS  
SHEET 2

64  
36

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Fig. 2



Fig. 3

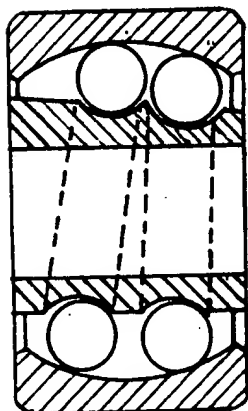


Fig. 4

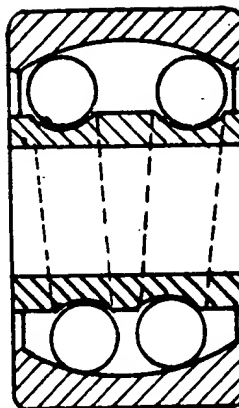


Fig. 5

